

CLAIMS

What is claimed is:

- Sub A*
1. A substrate load lock comprising:
a frame forming at least three chambers; and
a substrate support movably mounted to the frame, the substrate support having at least two separate support areas, a first one of the support areas being movable between a first one of the chambers and a second one of the chambers and, a second one of the support areas being movable between the second chamber and a third one of the chambers.
 2. A substrate load lock as in Claim 1, wherein the second chamber has an upper opening communicating with the first chamber, the opening being adapted to admit the first support area therethrough.
 3. A substrate load lock as in Claim 1, wherein the second chamber has a lower opening communicating with the third chamber, the opening being adapted to admit the second support area therethrough.
 4. A substrate load lock as in Claim 1, wherein the second chamber ^{has} a first hole communicating with the first chamber and a second hole communicating with the third chamber and wherein the substrate support extends through the second chamber within the first hole and the second hole.
 5. A substrate load lock as in Claim 1, wherein the substrate support comprises means for sealing the second chamber from the first chamber and the third chamber.
 6. A substrate load lock as in Claim 5, wherein the means for sealing the second chamber comprise the

substrate support having three seal members thereon located so that the first support area is between a first one of the seal members and a second one of the seal members, and the second support area is between the second seal member and a third one of the seal members.

7. A substrate load lock as in Claim 6, wherein the first seal member and the second seal member seal the second chamber when the first support area is in the second chamber, and the second seal member and the third seal member seal the second chamber when the second support area is in the second chamber.

8. A substrate load lock as in Claim 1, wherein the second chamber has a closable aperture adapted to allow a substrate to pass therethrough when the substrate is being transported between the load lock and a substrate processing device.

9. A substrate load lock as in Claim 1, wherein the first chamber has a first substrate transport aperture through which substrates are transported between a supply module and the first support area when the first support area is in the first chamber, and wherein the third chamber has a second substrate transport aperture discrete from the first substrate transport aperture, the second substrate transport aperture allowing substrates to be transported between the supply module and the second support area when the second support area is in the third chamber.

10. A substrate load lock as in Claim 1, wherein the first support area and the second support area each have a plurality of supports so that each support area may support a plurality of substrates.

Sub 26
~~11. A substrate load lock comprising:~~

a frame forming at least one sealable chamber;

means for varying the environment of the chamber;
and

at least two substrate supports movably connected to the frame so that each substrate support is alternately movable into the sealable chamber;

wherein, when the sealable chamber is sealed, only one of the substrate supports is located therein.

12. A substrate load lock as in Claim 11, wherein the two substrate supports are moved by a common actuator mounted to the frame.

13. A substrate load lock as in Claim 12, wherein the actuator has a reciprocating member within the frame, the two substrate supports being connected to the reciprocating member so that the two substrate supports reciprocate in phase with the reciprocating member in a direction substantially parallel to a stroke of the reciprocating member.

14. A substrate load lock as in Claim 12, wherein the actuator is a poppet moving a first one of the substrate supports between an upper chamber of the load lock and the sealable chamber, and moving a second one of the substrate supports between a lower chamber of the load lock and the sealable chamber.

15. A substrate load lock as in Claim 12, wherein the sealable chamber has an upper aperture communicating with an upper chamber of the load lock and a lower aperture communicating with a lower chamber of the load lock.

16. A substrate load lock as in Claim 15, wherein the actuator has a reciprocating member within the frame,

the reciprocating member having seal plates thereon to seal the upper aperture and lower aperture of the sealable chamber when each of the two substrate supports is located therein.

17. A substrate load lock as in Claim 16, wherein the reciprocating member has three of the seal plates; an upper one of the seal plates being adapted to engage an upper seal of the upper aperture to close the upper aperture, a bottom one of the seal plates being adapted to engage a lower seal of the lower aperture to close the lower aperture and a middle one of the seal plates being adapted to engage a lower seal of the upper aperture to close the upper aperture and being adapted to alternatively engage an upper seal of the lower aperture to close the lower aperture.

18. A substrate load lock as in Claim 17, wherein the middle seal plate closes the upper aperture when the bottom seal plate closes the lower aperture and wherein the middle seal plate closes the lower aperture when the upper seal plate closes the upper aperture.

19. A substrate load lock as in Claim 18, wherein the upper seal plate has an upper surface subjected to atmospheric pressure and the middle seal plate has a lower surface subjected to atmospheric pressure, the upper surface of the upper seal plate being larger than and facing substantially opposite to the lower surface of the middle seal plate so that atmospheric pressure urges the upper seal plate against the upper seal of the upper aperture and the middle seal plate against the upper seal of the lower aperture when the sealable chamber has a vacuum therein.

20. A substrate load lock as in Claim 18, wherein the bottom seal plate has a lower surface subjected to

atmospheric pressure, and the middle plate has an upper surface subjected to atmospheric pressure, the lower surface of the bottom seal plate being larger than and facing substantially opposite to the upper surface of the middle seal plate so that atmospheric pressure urges the bottom seal plate against the lower seal of the lower aperture and the middle seal plate against the lower seal of the upper aperture when the sealable chamber has a vacuum therein.

21. A substrate load lock comprising:

a frame having a chamber formed therein, the chamber having an upper substrate receiving opening and lower substrate receiving opening; and

a moving support attached to the frame, the moving support having an upper substrate support area and a lower substrate support area, wherein the moving support reciprocates ^{for} ~~to~~ alternately ^{moving} ~~move~~ the upper support area and the lower support area into the chamber, the upper support area ^{being} ~~begin~~ moved through the upper substrate receiving opening and the lower support area being moved through the lower substrate receiving opening.

22. A substrate load lock as in Claim 21, wherein the moving support has seals to close the upper substrate receiving opening and the lower substrates receiving opening so that the chamber is isolated from an upper plenum of the load lock and a lower plenum of the load lock.

23. A substrate load lock as in Claim 21, wherein the moving support has an upper one of the seals, a middle one of the seals and a lower one of the seals, the upper substrate support area being located between the upper seal and middle seal and the lower substrate

21

support area being located between the middle seal and the lower seal.

24. A substrate load lock as in Claim 23, wherein the upper seal and middle seal respectively close the upper substrate receiving opening and the lower substrate receiving opening when the moving support moves the upper substrate support area into the chamber, and wherein the middle seal and lower seal respectively close the upper substrate receiving opening and lower substrate receiving opening when the moving support moves the lower substrate support area into the chamber.

25. A substrate load lock as in Claim 21, wherein the chamber has a substrate transport slot in a side of the chamber so that the chamber communicates with a processing chamber of a substrate processing device, the slot having a gate to isolate the chamber from the processing chamber in the processing device when the upper substrate receiving opening and the lower substrate receiving opening of the chamber are open.

Sub 26 26. A method for transporting a substrate between a substrate processing device and a supply module comprising the steps of:

transporting the substrate between a movable first substrate support area in a load lock and the supply module, the first substrate support area being located in an initial position wherein a first substrate transport mechanism for transporting substrates between the supply module and load lock has access to the first substrate support area;

moving the first substrate support area within the load lock from an initial position to a final position, wherein in the final position a second

substrate transport mechanism has access to the first substrate support area; and

transporting the substrate with the second substrate transport mechanism between the first substrate support area in the load lock and the substrate processing device.

27. A method for transporting a substrate as in Claim 26, wherein ^{the} second substrate support area of the load lock is moved within the load lock from an initial position to a final position when moving the first substrate support area, the first substrate transport mechanism having access to the second substrate support area when the second substrate support area is in its final position.

Sub 28 28. A method for transporting a substrate as in Claim 27, wherein the first substrate support area and the second substrate support area are connected to a common support movably mounted to the load lock.

29. A method for transporting a substrate as in Claim 26, wherein the step of transporting the substrate between the first substrate support area in the load lock and the substrate processing device comprises changing the environment within a first part of the load lock having the substrate support area therein while maintaining the environment of a second part of the load lock unchanged.

Add 25